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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/807,932	03/23/2004	Qingqiao Wei	200314202-1	5174
22879      7590      04/18/2008 HEWLETT PACKARD COMPANY P O BOX 272400, 3404 E. HARMONY ROAD INTELLECTUAL PROPERTY ADMINISTRATION FORT COLLINS, CO 80527-2400				
EXAMINER SINES, BRIAN J				
ART UNIT 1797		PAPER NUMBER		
NOTIFICATION DATE 04/18/2008		DELIVERY MODE ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

**Application No.**

10/807,932

**Applicant(s)**

WEI, QINGQIAO

**Examiner**

Brian J. Sines

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 January 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-55 is/are pending in the application.  
4a) Of the above claim(s) 33-55 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-32 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/CDC)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

This application contains claims 33 – 55 drawn to a nonelected invention. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### ***Response to Arguments***

Applicant's arguments with respect to amended claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1 – 32 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for catalyst materials, such as metallic catalysts comprising platinum, palladium, iridium, etc., does not reasonably provide enablement for all types or a number of other broadly unspecified materials. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to understand the invention commensurate in scope with these claims. The scope of the claimed subject matter pertaining to the type of materials that may be used to functionalize the nanowire is not commensurate in scope to what is specifically enabled by the disclosure (see applicant's specification, paragraph 23).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1 – 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 – 32 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are:

Regarding amended claim 1, the scope of the newly added recitation “includes a number of materials...” in line 4 is unclear. Does the number of materials indicate a plurality of *different types* of materials or a plurality of the *same* material? Furthermore, the type of material used to impart the recited functional characteristic is unclear. For example, is the material a *catalyst* material? In claims drawn to an apparatus statutory class of invention, the structure which goes to make up the device must be clearly and positively specified. The structure must be organized and correlated in such a manner as to present a complete operative device (see MPEP § 2172.01). Furthermore, a feature that is taught as critical in the specification should be clearly recited in the claims (see MPEP § 2164.08c).

***Claim Rejections - 35 USC § 103***

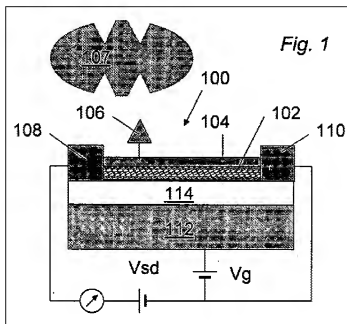
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
1. Claims 1 – 20 and 22 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Star et al. (U.S. Pat. Appl. No. US 2004/0132070 A1, filed 11/7/2003) (“Star”) in view of Chung (U.S. Pat. No. 5,576,563, filed 4/24/1995) (“Chung”).

Regarding claims 1, 13 – 16, 22 and 23, Star teaches a sensing device structure 100 having a field-effect transistor configuration comprising: a nanowire or nanotube 102 disposed on an insulating substrate comprising a passivation layer 114 comprising silicon dioxide that is structurally equivalent to the recited integral thermal insulation layer; two electrical contacts, i.e., source electrode 108 & drain electrode 110; a gate electrode 112 (see, e.g., paragraphs 6, 26 and 27; figure 1).



Star teaches that the nanotube can be functionalized with either a polymer layer comprising bioreceptor molecules or iron nanoparticles (see, e.g., paragraphs 26 – 30). The nanotube 102 is covered with a polymer coating layer 104 onto which a bioreceptor molecule 106 is attached by a chemical bond to the underlying layer (see, e.g., paragraph 26; figure 1).

Star does not specifically teach the incorporation of a heater with the disclosed device.

The applicant is advised that the Supreme Court recently clarified that a claim can be proved obvious merely by showing that the combination of known elements was obvious to try. In this regard, the Supreme Court explained that, “[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill in the art has a good reason to pursue the known options within his or her technical grasp.” An obviousness determination is not the result of a rigid formula disassociated from the consideration of the facts of the case. Indeed, the common sense of those skilled in the art demonstrates why some combinations would have been obvious where others would not. The

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combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int'l v. Teleflex Inc.*, 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007) (see MPEP § 2143). In this regard, Chung does teach that the incorporation of heater with a similar chemical sensor comprising a field-effect transistor configuration affords improved sensor performance. Chung teaches that it has been found to be desirable that the operating temperature be elevated above the ambient temperature to provide improved performance for the sensor (see, e.g., col. 1, lines 9 – 49; col. 3, line 38 – col. 4, line 39). The expectation of some advantage or desirable result is the strongest rationale for combining the teachings of references (see MPEP § 2144, Part II). Furthermore, it is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by the applicant (see MPEP § 2144, Part IV). The similar incorporation of a heater disposed proximate with the FET-based chemical sensor of Star to afford the predictable and desirable result of improving sensor performance would have been obvious to a person of ordinary skill in the art.

Regarding claims 2 and 11, Star teaches the incorporation of silicon with the nanowires or nanotubes (see, e.g., paragraph 7).

Regarding claims 3 and 11, Star teaches that the nanotubes can be doped or functionalized. This doping or functionalization of the nanotube inherently changes the conductivity of the nanotube (see, e.g., paragraphs 25 – 28) (see MPEP § 2112).

Regarding claims 4 – 10, 12 and 24, Star teaches the incorporation of iron catalyst nanoparticles (see, e.g., paragraph 30).

Regarding claims 17 – 20, Chung teaches that the heating layer 30 is disposed sufficiently close to gate electrode layer 20 to provide uniform heating thereof (see, e.g., col. 2,

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lines 31 – 62). The combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int'l v. Teleflex Inc.*, 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). Therefore, it would have been obvious to a person of ordinary skill in the art dispose the integral heater as claimed with the disclosed sensing device in order to facilitate effective temperature control that would impart improve the performance of the sensing device.

Regarding claim 25, Chung teaches the use of a controlled temperature environment with the operation of the disclosed device (see, e.g., col. 3, lines 38 – 67). Therefore, it would have been obvious to a person of ordinary skill in the art to incorporate a temperature sensor as claimed with the disclosed device to facilitate effective temperature monitoring and control.

Regarding claims 26 – 29 and 31, the use of a sensor array configuration comprising a plurality of sensors would have been obvious to a person of ordinary skill in the art. The mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art (see MPEP § 2144.04).

Regarding claim 30, the incorporation of differently functionalized sensors within sensor arrays for detecting distinct substances is very well known in the art (see MPEP § 2144.03).

Regarding claim 32, the use of non-functionalized control or reference sensors within a sensor array is very well known in the art (see MPEP § 2144.03).



2. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable Star and Chung in view of Trautweiler et al. (ref. no. 1S on the IDS filed 3/23/2004) ("Trautweiler").

Regarding claim 21, neither Star nor Chung specifically teaches the incorporation of the substrate configuration as claimed. However, Trautweiler teaches a sensor configuration further comprising a heating device, wherein the sensor configuration has an open or removed portion underneath the sensor and the micromachined diaphragm (see figure 1). The Supreme Court has decided that the combination of familiar elements is likely to be obvious when it does no more than yield predictable results. See *KSR Int'l v. Teleflex Inc.*, 127 Sup. Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). It would have been obvious to a person of ordinary skill in the art dispose the integral heater as claimed with the disclosed sensing device in order to facilitate effective temperature control that would impart improve the performance of the sensing device.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian J. Sines whose telephone number is (571) 272-1263. The examiner can normally be reached on Monday - Friday (11 AM - 8 PM EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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